Remarks:

This amendment is submitted in an earnest effort to advance this case to issue without delay.

The specification has been amended to eliminate some minor obvious errors. No new matter whatsoever has been added.

The claims have been revised to place them in better form, to cure the minor §112 problems, and to define the invention with greater particularity over the art.

A new claim 21 has been added that recites subject matter found in the original specification on page 19, lines 32 35 and in FIG. 2. This specification portion states that in FIG. 2 there are shown the aberration losses and FIG. 2 shows that these losses are always less than 2% (i.e. 10-2).

The cavity of the present application is a miniaturized cavity having, as now clearly defined in claim 1, a length that does not exceed ten times the sum of the lengths of its crystals. This specific dimensional language replaces the "miniaturized" term that might have lacked clarity. This means that the length of the cavity is only a few centimeters and, in this respect, the original specification page 12, line 11, discloses a resonator having a length of 5-10 cm.

On the contrary, the device of US 6,287,298 of Nigham is not miniaturized at all and, in fact, Nigham, specification, col. 9, lines 17-18, discloses a resonator having a length of "about 1 m." In addition, according to Nigham, in order to achieve high amplitude stability, a large number of axial (i.e. longitudinal) modes must oscillate within the cavity and, with the components described in that patent, a resonator of about 1 m in length must be chosen (Nigham, col. 9, lines 52-55). This is about ten times longer than the dimensions contemplated by the instant invention.

It must also be remarked that according to Nigham the crystal must be heated to about 155°C; it is evident that the resonator may not be miniaturized if it must include a component having such a high working temperature.

Therefore, the device of Nigham cannot be made small or miniaturized (i.e. with a length not exceeding ten times the sum of the length of the crystals, thus some centimeters) because operational problems (i.e. amplitude stability) and practical construction problems (i.e. a component to be brought and kept at about 155°C) would arise.

In addition, according to Nigham a type I non-critical phase matching crystal is used. As known in the art and as disclosed by US patent publication 2004/0071179 of Zanger "in case of non-critical phase matching the efficiency of frequency conversion is generally higher and the beam profile of the converted beam is of higher quality" (Zanger, paragraph 7, lines 8-11). Nevertheless, this reference goes on to say that at present "no

crystal material exists, with which laser light can be produced in the low UV range with non-critical phase matching" (Zanger, paragraph 7, lines 15-17.

Therefore, in Zanger the choice of the critical phase matching is required, even if it causes worse performance.

In Nigham there is no need to modify the crystal and the type of phase matching as disclosed by Zanger because crystals which allow visible light laser to be realized do exist.
Finally, it should be pointed out that the device of Zanger generates UV light (not visible) as a Second Harmonic of an existing visible laser source. Zanger does not disclose solutions for generating visible light in Second Harmonic inside a laser cavity with efficiency and high beam quality. As known in the art an extra-cavity second harmonic converter applied to a stable CW laser source is generally one order of magnitude less efficient than an intra-cavity frequency-doubled laser. Thus the person skilled in the art would not have modified the device of Nigham as disclosed by Zanger because the two devices are different per se and have different efficiency and application fields. The rejections under §103 in view of Nigham and Zanger must therefore fall.

Generally speaking, the walk-off effect is not a favorable feature of a laser and when the amount of walk-off is not negligible, it is considered a serious defect of the laser beam. In this respect also Zanger discloses that "the level of conversion is

reduced by walk-off effect which occurs with critical phase matching (Zanger, paragraph 20, lines 1-3).

Therefore the Examiner's suggestion that one skilled in the art would have replaced the non-critical phase matching of Nigham with the critical phase matching of Zanger in order to have a higher walk-off effect (i.e. to worsen the level of conversion) is not feasible.

In addition, due to the very long path of the resonator (about 1 m), the device of Nigham cannot efficiently operate in critical phase matching.

Thus the man skilled in the art would not have modified the device of Nigham as disclosed by Zanger to get to the apparatus of the instant invention, because such a modification would have caused a worsening of the operation of the device.

In sum: According to independent claim 1, the device has a very small resonator (its length does not exceed ten times the length of the crystals) and has the whole cavity associated with thermostating means for locking the temperature of the cavity (not the crystal or only the crystal).

This structure allows very small losses to be suffered, i.e. the operation of the device is very efficient and cause a very small walk-off to be produced, even when operating with critical phase matching.

Finally the structure and the adoption of type I critical phase matching allows simple and economical devices to be realized.

The same considerations apply for independent method claim 19.

Thus all the claims in the case are in condition for allowance. Notice to that effect is earnestly solicited.

If only minor problems that could be corrected by means of a telephone conference stand in the way of allowance of this case, the examiner is invited to call the undersigned to make the necessary corrections.

Respectfully submitted,
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